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Procedia - Social and Behavioral Sciences 217 (2016) 26 – 33

Procedia
Social and Behavioral Sciences

Future Academy®'s Multidisciplinary Conference

Didactic Tools' of Selection in the Use of Active and Interactive Training Methods

Nina Bordovskaia[a]*, Larisa Darinskaya[a], Olga Zhebrovskaia[a]

[a] *St. Petersburg State University, Saint-Petersburg, 199034, Russia*

Abstract

This paper is based on the analysis of the wide use of active and interactive teaching methods in Russian higher education practice (580 situations). The contents of various types of problems related to the choice of these methods as well as the differentiation of knowledge and skills, that are not enough for the successful application of each group of methods, are described. The paper represents interpretation of the results obtained in studying of the use of active and interactive methods for solving educational, professionally oriented and communicative developmental tasks by lecturers. The relationship of didactic tools selection and its dependence on specialization of teaching (Humanities and Sciences), scientific pedagogical experience, age and commitment to professional development is revealed.

Peer-review under responsibility of Future Academy® Cognitive Trading

Keywords: lecturer, selection, teaching method.

1. Introduction

Recently, in educational practice of higher education institutions the problem of selection and application of active (ATM) and interactive teaching methods (ITM) by lecturers of socio-humanitarian and science disciplines became actual. This is due to the need to increase the proportion of students` active participation in enhancing the effectiveness and efficiency of the educational process. It should be noted, these issues are studied in contemporary didactics and are widely discussed in scientific publications.

* Corresponding author. Tel.: +7-921-984-45-57; fax: +7-812-328-00-01
E-mail address: nina52@mail.ru

Peer-review under responsibility of Future Academy® Cognitive Trading
doi:10.1016/j.sbspro.2016.02.009

Active learning is considered as an alternative to traditional learning. At the level of methodology different approaches to organization of active learning are identified (Bordovskaia N.V., Zhebrovskaia O.O., 2013). On the one hand, active learning is regarded as organization of educational process that encourages students to active actions and autonomous (or with the help of a teacher) decisions under the influence of various factors (psychological, didactic, pedagogical) (Bordovskaia N., 2013). On the other hand, active learning is caused by a certain way of thinking that reflects the quality of the experience of thinking activities that promotes active inclusion of the subject in the learning process (Darinskaya L., Rozum S., 2014). For students to be included in learning means to understand it, to get pleasure from the educational process, to feel connection with what is studied. It is more than simply to learn (Strachan R., Liyanage L., 2015). According to the researchers (Anthony G., 1996; HoutWolters B.V., Simons, R.-J., Volet, S., 2000), these two approaches do not contradict each other, and can be considered as a strategy of active learning (Bordovskaia N.V., Rozum S.I., 2011).

Current publications reflect the extensive experience of application of active and interactive teaching methods. They include team work; group project; preparation of an essay; written or oral formulation of conclusions of joint work results, done at the teacher`s request; assessment of joint work results; training of team roles; overseeing the work of other teams and analyzing their mistakes; role-playing games and discussions; competitions for the best project, etc. (Lorenc M., Chládová M., Jarošová E., 2012). One of the active ways of engaging students in cognitive activities is a method of associogram that facilitates the integration of knowledge into cognitive structure (Norpulatova H., 2012). The use of different modeling methods (imitational, situational) contributes to better understanding of the material (Bluestone Ch., 2007). The technology of focused interactive teaching is applied when students explore scientific concepts through focus group sessions. It is empirically proven that focused interactive teaching increases the effectiveness of testing students, helps them get acquainted with other students and influences the increase of interest in the study of academic disciplines (for example psychology) (Harton, H.C., Richardson D.S., Barreras R.E., Rockloff, M.J. & Latane B., 2002).

In some publications the authors present the results of integration of active and interactive methods of teaching into the educational process. In particular, the use of such methods has a positive impact on the academic success of students with learning problems (Peter K.M., Banciu V., Florescu M.C.,2014).

How do students feel about using of active and interactive methods in the educational process? According to the results of special studies (Sempere J., García M., Marco F., Sen M.L. de la, Segovia Y., 2010) it is found that students appreciate cooperative learning and group work methods. They believe that these methods can help to get actively involved in the learning process and different learning activities that actualize the thinking processes (analysis, synthesis, information retrieval, etc.), to develop training skills and to work in a team. However, some students speak against the continuous application of active learning methods, because this alternative is in contrast with a very familiar role of a passive listener to which they are accustomed.

What problems do University lecturers face in application of group's teaching methods? One of the essential problems in application of these methods is complexity in the organization of effective teacher-student interaction in the learning process and complexity of selection of the appropriate method for formation of professional competence of the modern competitive specialist (Mitkina O., 2010; Yakovlev E., Yakovleva N., 2011). Active and interactive teaching methods are called methods of "high risk" because they, in the opinion of N. Hativa, cause chaos in organization of the learning process (Hativa N., 2000). Lecturers of Science and Humanities are especially critical about these methods. Therefore, in the opinion of some researchers, during training sessions, none of these methods should be used singly, you need a balance of active and passive teaching methods (Hativa N., 2000; McCarthy J. P., Anderson L., 2000).

Analysis of literature and educational practice in higher education institutions identifies the main tendency in development of modern higher education, namely the variability and breadth of application of innovative active and interactive methods of teaching. However, in order to increase the efficiency of application of these methods, it is important to determine their capability to solve main problems faced by lecturers, and the nature of arising difficulties.

Within the identified problems, we have developed research questions. The research questions of the study are:

- How can didactic tools selected by lecturers using active and interactive teaching methods be characterized?

- How does selection of didactic tools correlate with lecturer`s specialization, experience, age, professional development?

The goal of the study is to determine the features of didactic tools related to active and interactive teaching methods, but also:

- to identify which methods are the most relevant for lecturers of Sciences and Humanities;
- to describe typical features of the tasks for which active and interactive teaching methods are used in the practice of teaching and their ratio depending on specialization of teaching (Sciences or Humanities);
- to determine the nature of assistance in the work of teachers with active and interactive methods of teaching according to specialization of teaching (Sciences or Humanities), age and teaching experience.

For our purposes, didactic Toolkit is a substantial variety of active and interactive teaching methods used in higher education.

For determining features of didactic tools related to active and interactive teaching methods it is necessary to identify most relevant methods used by lecturers; to describe typical training situations; to reveal ways of assistance which lecturers need depending on their specialization of teaching (Sciences or Humanities), age, experience and professional development.

2. Methods and study design

2.1. The study was carried out in three stages. In the first stage we refined understanding of active and interactive teaching methods in the works of Russian and foreign scientists and their role in higher education. In the second stage the strategy and design of the study, and also methods of detection of ratings of 235 teachers regarding the distinguishing features of these teaching methods and their effects on the nature of teachers` and students` activities were determined,. In the third stage the variety of manifestations of active and interactive methods in practice of higher education institutions, reasons for their classification, and frequency of application of these methods in educational situations at the faculty of Humanities and Sciences of Russian universities, the specificity of knowledge and skills that teachers need for successful use of the methods were examined.

2.2. Participants. Lecturers of St. Petersburg State University, Russian State Pedagogical University named after A.I. Herzen, Institute of Shipbuilding and Arctic Marine Engineering, Severodvinsk branch of Northern (Arctic) Federal University named after M.V. Lomonosov, St. Petersburg Academy of Postgraduate Pedagogical Education, Pedagogical College, Petrozavodsk State University, Kalmyk State University. Total 235 people, research and teaching experience from 1 to 45 years. Age from 25 to 70. Among the participants - 62.3% of teachers of humanitarian and 37.7% of science disciplines.

2.3. Research methods and tools. To study the experience of application of active and interactive teaching methods in the educational process specially designed questionnaires for lecturers were used. The results of the survey were processed by the method of content analysis and text analysis program Textus Pro 1.0. We used methods of socio-pedagogical research: participant observation, conversation, studying of products of teachers` activity (methodical developments, lecture notes, publications in periodicals, reports, video lectures, etc.) and analysis of 580 academic situations. Statistical and mathematics methods of analysis of empirical data were applied.

3. Results

3.1. Content analysis of the questionnaires of teachers identified the main indicators in assessing the impact of active and interactive methods on the nature of activities of a teacher and students with the determination of the percentage mentioned in the surveys (in relation to the number of participants 235 people – 100%). It is found that use of active and interactive methods in the educational process influences activities:

(a) of teachers:

– the changing role of the teacher (consultant, organizer, moderator, mentor, helper) -11.1% ;
– obtaining feedback – 6.2%;
– development of students` practical skills - 4.1%;
– modeling of professional and social situations - 3.3%;
– individual approach to students - 2.3%.

b) of students:

– interaction of students among themselves and with the teacher – 61.3%;
– interaction of students among themselves - 24.7%;
– active participation in learning process, initiative, involvement - 23.5%;
– autonomous work, self-education - 21%.

As can be seen from the obtained results, active and interactive methods, according to the teachers, have a greater influence on the nature of students` activities in educational practice. The quantitative ratio in the assessment of changes in the nature of activities of students and teachers can be determined as 70% and 30%, respectively. It is established that in the teacher`s activity, first of all, the role of the teacher in the educational process changes. Such roles as an organizer, a consultant, a moderator, a mentor, an assistant become predominant (17.1%). In the process of application of active and interactive methods in students` activities, according to the teachers, active and interactive teaching methods have a greater influence on the nature of interaction not only with a teacher (58.2%), but also with students (24.7%) in the educational process.

3.2. Analysis of 580 educational situations applied by University teachers has allowed to establish the basis for selection of active and interactive methods (character of set goals and objectives) and to clarify the content of the used didactic tools.

The tools were divided into three groups in accordance with the types of educational objectives (Table 1):
• the first group includes situations of solution of educational tasks specific to the discipline (Humanities and Sciences);
•the second group is represented by situations of solution of professionally oriented tasks;
• the third group of situations reveals features of the organization of effective communication and joint activities of students.

The Table 1 shows the frequency of application of active and interactive methods in analyzed educational situations through the most used varieties of didactic tools.

Table 1. The matrix of frequency of application of active and interactive teaching methods by all research participants (percentage share of total number of references of active, interactive methods).

Teaching methods	Tasks			Mean value
Active	Academic-cognitive	communicative-developmental	Professionally oriented	
Work with visual materials	4.07	4.74	4.12	4.31
Communicative exercises, dialogue with a teacher, active lectures	12.22	11.34	14.00	12.17
Reflection (including in blogs)	1.21	0.86	0.82	0.93
Conversation	2.22	1.29	2.06	1.85
Distance learning	0.74	0.86	0	0.53
Search task on the Internet	1.11	1.72	2.06	1.63
Control	2.22	1.72	0.82	1.58
Interactive	Academic-cognitive	communicative-developmental	Professionally oriented	Mean value
Work in pairs, groups	5.93	6.03	8.23	6.73
Games: role-playing, business, organizational, etc.	14.81	14.22	16.46	15.16
ICT	3.33	3.45	3.70	3.49
Case-study	8.89	13.36	7.00	9.75
«Brainstorming»	5.19	5.60	5.35	5.38
Discussions	11.85	11,64	13.17	12.22
Projects	4.07	3.85	2.06	3.06
Creative tasks, researches	14.45	11.64	8.23	11.44
Trainings, workshops, practice, excursions, seminars	4.44	5.17	9.05	6.22

Peer coaching	2.96	1.72	2.06	2.24

As can be seen from Table 1, interactive methods are used more often than active. The average number of references to active methods is 22.59% and interactive methods – 77.41%. From the set of the most popular interactive methods, the highest frequency of use is characteristic for role-playing, business and organizational games (15.6% of the total number of interactive methods), discussion methods (12.22%), various creative tasks and researches (11.44%). The study shows that teachers identify the expediency of using active and interactive teaching methods not only in terms of direct contact between the participants of the educational process, but indirectly through application of interactive, multimedia technologies (working with the resources of the Internet, materials of distance learning courses, blogs of teachers, forums, social networks, etc.).

3.3. The discovered differences in the frequency and content specifics of application of active and interactive teaching methods at the faculties of Humanities and Sciences are presented in Table 2.

Table. 2. The matrix of differences in content specificity and frequency of application of active and interactive teaching methods at the faculty of Humanities and Sciences (percentage share of total number of references of active, interactive methods).

Teaching methods	Lecturers of Humanities			Lecturers of Sciences		
	Tasks			Tasks		
Active	Academic-cognitive	Communicative-developmental	Professionally oriented	Academic-cognitive	Communicative-developmental	Professionally oriented
Work with visual materials	2.43	2.29	1.61	5.62	7.46	6.27
Communicative exercises, dialogue with a teacher,	12.54	10.68	13.30	10.84	10.37	12.10
Reflection (including in blogs)	2.09	3.05	3.22	0.40	0.82	0.44
Conversation	2.78	2.67	2.41	1.20	0.82	0.89
Distance learning	0.34	0.38	0	1.60	1.65	1.34
Search task on the Internet	0.69	1.14	1.61	2.00	3.31	3.13
Control	2.09	1.52	0.80	2.22	0.82	1.34
Interactive	Academic-cognitive	Communicative-developmental	Professionally oriented	Academic-cognitive	Communicative-developmental	Professionally oriented
Work in pairs, groups	6.62	7.63	10.00	4.01	9.58	4.48
Games: role-playing, business, organizational, etc.	19.51	19.84	19.3	12.85	14.10	16.59
ICT	2.09	1.52	2.01	5.22	4.97	4.93
Case-study	6.62	6.48	5.64	11.24	13.27	16.59
«Brainstorming»	4.18	6.10	6.85	5.22	5.80	5.38
Discussions	12.89	14.12	14.11	9.23	7.88	8.07
Projects	4.52	3.82	2.82	6.02	4.97	1.34
Creative tasks	11.14	9.54	6.85	16.86	14.93	11.65
Trainings, workshops	5.22	6.10	5.64	3.61	3.31	4.39
Peer coaching	4.18	3.05	3.62	2.00	1.65	1.79

Table 2 shows that the lecturers of humanities in comparison with the lecturers of sciences in selection of teaching methods prefer games, work in groups and pairs, discussions. The teachers of natural and exact sciences select solving tasks, including creative, ICT, working with visual AIDS, case studies.

3.4. The differences in frequency of application of active and interactive teaching methods by lecturers according to their scientific and pedagogical experience have been identified. It is found that teachers with working experience at University not more than 10 years, often use projects, ICT, case studies and creative tasks, including the Internet, i.e. interactive methods. Teachers with experience in the range of 10 to 20 years, often use such techniques as work in groups and pairs, games (interactive methods), communicative activities, dialogues with teachers (active methods). Teachers with an experience of over 20 years often choose in their work with students communicative exercises, dialogues, presentations, discussions, i.e. they prefer active teaching methods. In the group of teachers with experience of more than 30 – 40 years active lectures, talks, discussions predominate in university classrooms.

3.5. About 70% of survey participants experience difficulties related to the use of active and interactive methods. A significant portion of these problems is caused by lack of time and more labor-intensive preparation and training. The next group of problems are related to technical equipment of classrooms, lack of technical training. Finally, the third group of problems are associated with motivating students to participate in classes with the use of active and interactive methods, with personal characteristics of students. Only a small portion of respondents indicated as actual problems lack of personal experience with effective use of active and interactive teaching methods, lack of training for the use of modern educational and information technologies.

3.6. There are different types of assistance that study participants would like to get: exchange of experience with colleagues, creation of the methodical bank available for teachers of all universities, technical support of the process of application of active and interactive teaching methods, opportunities for professional development in the field of new active and interactive teaching methods. About 57.5% of participants expressed a wish to improve their skills in the use of active and interactive methods, 33% - in the field of technical support of active and interactive forms of work with students (work with a new equipment, creation of distance courses, etc.), and 9.5% - in the field of psychological basis of application of active and interactive teaching methods.

4. Discussion

Analysis of the results of the review sources (publications in Russian and foreign journals, questionnaires) on the issue of application of ATM and ITM has revealed the following. At the level of methodology of the research of the problem of applying ATM and ITM among foreign and Russian scientists there are different points of view in search and selection of approaches to understanding of active learning, classification and separating of ATM and ITM. Practicing teachers focused on the application of individual approach to students in active learning. Among those approaches there are no contradictions, they are focused on humanistic understanding of the educational process. Analysis of works that identify features of ATM and ITM has allowed to reveal that the key word that connects all of these methods is interaction. This refers to the interaction of all subjects of educational process – students among themselves and with the teacher. As for the positions of representatives of foreign science and native practicing teachers, in general, they do not see much difference between these two groups of methods. Most common is the view that the ITM is the modern form of the ATM with a wide range of ICT and social network services. With regard to organization of educational process with application of ATM and ITM foreign authors and Russian teachers prefer different forms of situational simulations, i.e., design and creation of situations of choice, success, search, etc.

Among the topical problems Russian scientists and practicing teachers unanimously identify the problem of training of high school teachers in application of ATM and ITM that will lead to the change of their roles and increase the willingness to become a mentor, assistant, consultant, etc. The problem of effective ways of the development of students` independence and mechanisms of their involvement in the learning process is also marked. This implies the importance of teacher training programs for using ATM and ITM that will foster students` cognitive activity, the development of independence, self-organization, etc.

In general we can say that the comparative analysis shows the similarity of positions of foreign researchers and

Russian practicing teachers. This conclusion is quite natural, because foreign education, as is known, is largely practice-oriented. Accordingly, issues that concern national practicing teachers are actual and are the subject of study of foreign scientists. As for the Russian representatives of pedagogical science in their works abstract problems are mostly reflected, for example, the problem of classification and separation of ATM and ITM, approaches to application of these methods. Thus, we can conclude that the Russian pedagogical science needs to interact with the real educational practice, to find ways to cope with the gap between theoretical development and needs of teachers who work directly with students. The problems of preparation of teachers to work with modern teaching tools are most popular both in science, and in practice, i.e., this requires a set of psychological and pedagogical research in the field of high school didactics, educational psychology, psychology of modern student and teacher.

5. Conclusions

The study identified the theoretical and practical bases for choosing of active and interactive teaching methods in the educational practice of Russian universities. As theoretical bases significant features of active teaching methods were revealed. They include:

1) characteristics of active teaching methods:

- stimulation of activity and initiative of students in the classroom and consultation in the learning process;
- high degree of involvement of all students in the learning process and variety of students` activities in the classroom;
- focusing not only on the development or acquisition of scientific subject and meta-subject (e.g., research) skills, but also on creative self-realization;
- constant feedback with students in the learning process.

2) characteristics of interactive teaching methods:

- interactive and communicative nature of learning;
- the dominance of forms of joint activities of students at all training sessions;
- pedagogical support and teacher`s assistance to individual students and study groups in educational situations;
- collaboration of students with different forms of manifestation of autonomy, initiative and creativity.

As practical bases for choosing of active and interactive teaching methods the types of educational objectives were identified, which include:

• learning objectives specific to the content of the discipline;
• objectives of organization of effective communication and joint activity of students;
• professionally-oriented tasks.

Russian teachers in selection and use of active teaching methods in working with students in different educational contexts are guided by the following principles:

– teacher` interaction with students should provide a manifestation of the position of the subject of educational activity;

– creation of conditions for the manifestation of different forms of activity of students based on their interests and capabilities, experience, training, research and professional activities;

– creation of conditions for selection and search, manifestation of students' intellectual, creative and personal potential.

Acknowledgements

Authors express deep gratitude to administration and lecturers of St. Petersburg State University, Russian State Pedagogical University named after A.I. Herzen, Institute of Shipbuilding and Arctic Marine Engineering, Severodvinsk branch of Northern (Arctic) Federal University named after M.V. Lomonosov, St. Petersburg Academy of Postgraduate Pedagogical Education, Pedagogical College № 8 of St. Petersburg, Petrozavodsk State University, Kalmyk State University for their help in organization of the study.

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